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ATTACHMENT C

SAMPLING AND ANALYSIS AND DATA MANAGEMENT PLAN
ADMINISTRATIVE ORDER ON CONSENT
U.S. EPA DOCKET NO.

The Site Investigation Work Plan, or any Additional Work Plan required of Respondent pursuant to the Order, shall include a plan to document all monitoring procedures (including all sampling, field measurements, and sample analysis performed during the investigation to characterize the environmental setting, source of contamination, and concentration of contaminants) so as to ensure that all information, data, and resulting decisions are technically sound, statistically valid, and properly documented. The plan shall include the following:

A. Data Collection Quality Assurance Plan

1. Data Collection Strategy

The strategy section of the Data Collection Quality Assurance Plan shall include, but not be limited to, the following:

- a. Description of the intended uses for the data, and the necessary level of precision and accuracy for these intended uses; and,
- b. Description of methods and procedures to be used to assess the precision, accuracy, and completeness of the measurement data.

2. Sampling

The Sampling section of the Data Collection Quality Assurance Plan shall discuss:

- a. Sampling methods including identification of sampling equipment, purging procedures, and decontamination procedures to be used;
- b. Criteria for selecting appropriate sampling locations, depths, etc.;
- c. Criteria for providing a sufficient number of sampling sites;
- d. Methods for measuring all necessary ancillary data;
- e. Criteria for determining conditions under which sampling should be conducted;
- f. Criteria for identifying which parameters are to be measured, and criteria for determining where specific parameters will be measured;
- g. Criteria for identifying the type of sampling (e.g., composites vs. grabs) and number of samples to be collected;
- h. Measures to be taken to prevent contamination of the sampling equipment and cross contamination between sampling points;
- i. Methods and documentation of field sampling operations and procedures, including:

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- (1) Documentation of procedures for preparation of reagents or supplies which become an integral part of the sample (e.g., filters and adsorbing reagents);
 - (2) Procedures and forms for recording the exact location, sampling conditions, sampling equipment and visual condition of samples;
 - (3) Documentation of specific sample preservation method;
 - (4) Calibration of field devices;
 - (5) Collection of replicate samples;
 - (6) Submission of field-biased blanks, where appropriate;
 - (7) Potential interferences present at the facility;
 - (8) Field equipment listing and sample containers;
 - (9) Sampling order; and,
 - (10) Decontamination procedures.
- j. Selection of appropriate sample containers;
- k. Sample preservation methods; and,
- l. Chain-of-custody procedures, including:
- (1) Standardized field tracking reporting forms to establish sample custody in the field prior to and during shipment; and,
 - (2) Pre-prepared sample labels containing all information necessary for effective sample tracking.

3. Field Measurements

The Field Measurements section of the Data Collection Quality Assurance Plan shall discuss:

- a. Selecting appropriate field measurement locations, depths, etc.;
- b. Providing a sufficient number of field measurements;
- c. Measuring all necessary ancillary data;
- d. Determining conditions under which field measurements should be conducted;
- e. Determining which media are to be addressed by appropriate field measurements (e.g., groundwater, air, soil, sediment, etc.);
- f. Determining which parameters are to be measured and where;

- g. Selecting the frequency of field measurement and length of field measurements period; and,
- h. Documenting field measurement operations and procedures, including:
 - (1) Procedures and forms for recording raw data and the exact location, time, and sampling conditions;
 - (2) Calibration of field devices;
 - (3) Collection of replicate measurements;
 - (4) Submission of field-biased blanks, where appropriate;
 - (5) Potential interferences present at the Site;
 - (6) Field equipment listing; and,
 - (7) Decontamination procedures.

4. Sample Analysis

The Sample Analysis section of the Data Collection Quality Assurance Plan shall specify the following:

- a. Chain-of-custody procedures, including:
 - (1) Certification that all samples obtained pursuant to this Order for analysis will be delivered to a responsible person at the recipient laboratory who is authorized to sign for incoming field samples, obtain documents of shipment, and verify the data entered onto the sample custody records;
 - (2) Provision for a laboratory sample custody log consisting of serially numbered standard lab-tracing report sheets; and,
 - (3) Specification of chain-of-custody procedures for sample handling, storage, and dispersment for analysis.
- b. Sample storage procedures and holding times;
- c. Sample preparation methods;
- d. Analytical procedures, including:
 - (1) Scope and application of the procedure;
 - (2) Sample matrix;
 - (3) Potential interferences;
 - (4) Precision and accuracy of the methodology; and,

- (5) Method detection limits.
- e. Calibration procedures and frequency;
- f. Data reduction, validation, and reporting; and,
- g. Internal quality control checks, laboratory performance, systems audits and frequency, including:
 - (1) Method blank(s);
 - (2) Laboratory control sample(s);
 - (3) Calibration check sample(s);
 - (4) Replicate sample(s);
 - (5) Matrix-spiked sample(s);
 - (6) "Blind" quality control;
 - (7) Control charts;
 - (8) Surrogate samples;
 - (9) Zero and span gases; and,
 - (10) Reagent quality control checks.

B. Data Management Plan

Respondent shall develop and initiate a Data Management Plan to document and track investigation data and results. This plan shall identify and establish data documentation materials and procedures, project file requirements, and project-related progress reporting procedures and documents. The plan shall also provide the format to be used to present the raw data and conclusions of the investigation.

1. Data Record

The data management system shall track the following information for each data record:

- a. Unique sample or field measurement code;
- b. Sampling or field measurement location including surveyed horizontal coordinates and elevation of the sample location, and sample or measurement type;
- c. Sampling or field measurement raw data;
- d. Laboratory analysis ID number;
- e. Result of analysis (e.g., concentration);

- f. Elevations of reference points for all groundwater level measurements, including water level elevation, top of casing elevation, and ground surface elevation; and,
- g. Electronic data files of all groundwater, soil, surface water, and sediment analytical data that can be down-loaded to the format specifications of the EPA Region 10 groundwater data management system.

2. Tabular Displays

The following data shall be presented in tabular displays, unless otherwise specified by EPA:

- a. Unsorted (raw) data;
- b. Results for each medium and each constituent monitored;
- c. Data reduction for statistical analysis;
- d. Sorting of data by potential stratification factors (e.g., location, soil layer, topography); and,
- e. Summary data.

3. Graphical Displays

At a minimum, the following data shall be presented in graphical formats (e.g., bar graphs, line graphs, area or plan maps, isopleth plots, cross-sectional plots or transects, three dimensional graphs, etc.), unless otherwise specified by EPA:

- a. Displays of sampling location and sampling grid;
- b. Identification of boundaries of sampling area and areas where more data are required;
- c. Displays of concentrations of contamination at each sampling location;
- d. Areal and vertical displays of contamination concentrations, concentration averages, and concentration maxima, including isoconcentration maps for selected constituents, subject to EPA review and approval, found in environmental media at the Facility;
- e. Illustrations of changes in concentration in relation to distance from the source, time, depth, or other parameters;
- f. Identification of features affecting intramedia transport and identification of potential receptors;
- g. For each round of groundwater level measurements, maps showing the distribution of head measurements in each aquifer at a scale of one inch equals 50 feet and a contour interval of one-half foot or other scale as approved by EPA; and,
- h. For each well, provide a hydrograph that shows the distribution of water level measurements taken during the site investigation for the time interval of the investigation. Multiple wells may be shown on one hydrograph if appropriate.

C. Data Reporting

Unless already required by the Order, Respondent shall provide to EPA the validated results of all sampling analyses obtained pursuant to this Order after completion of quality assurance/quality control activities, but in no event later than sixty (60) days of collection. This notification requirement shall also apply to any other information obtained from activities conducted, or data obtained, by Respondent that may influence activities pursuant to this Order.